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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/588,358

08/03/2006

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930086-2036

8667

20999 7590 02/26/2008
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EXAMINER

LOEWE, ROBERT S

ART UNIT

PAPER NUMBER

1796

MAIL DATE

DELIVERY MODE

02/26/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/588,358	Applicant(s) RHEE ET AL.	
	Examiner ROBERT LOEWE	Art Unit 1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 August 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☒ Claim(s) 4 and 6-13 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 August 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>8/3/06</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Abstract

The abstract is objected to because there is no "above reactive cyclodextrin" included in the abstract. Appropriate correction is required.

Specification

The specification is objected to because there is no "above reactive cyclodextrin" (p. 1 line 8) included. Appropriate correction is required.

Claim Objections

Claims 10-13 are objected as "films" should be replaced by --film--. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 4 and 5 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Specifically, claim 4 recites the limitation "said dielectric matrix" in line 1. There is insufficient antecedent basis for this limitation in the claim. Appropriate correction is required.

Claims 10-13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Specifically, claims 10-13 recite the limitations "the matrix solution" and "the template solution". There is insufficient antecedent basis for this limitation in the claim. For purposes of further examination, the term "matrix solution" will be interpreted as the solution containing the inorganic silicate precursor(s) and the term "template solution" will be interpreted as the solution containing the cyclodextrin nanoparticles. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yim et al. (US 2003/0055134), in view of Lambert et al. (*Chem. Mater.* **2003**, *15*, 131-145).

Yim et al. teaches a nanoporous composition comprising a porogen derivative (abstract). Yim et al. further teaches that the porogen derivative is a cyclodextrin having the general formula as shown in paragraph 0043. Yim et al. further teaches that specific cyclodextrin porogens having the general structures as shown in paragraph 0046. Yim et al. teaches that R_1 , R_2 , and R_3 can be a $Si r_1 r_2 r_3$ group with r_1 - r_3 being a C_{1-5} alkoxy group (paragraph 0045). The only structural differences between Yim et al. and formula 1 of instant claim 1 is the presence of a propyl spacer between the oxygen and the $Si r_1 r_2 r_3$ group. However, Lambert et al. teaches cyclodextrin compounds which comprises a trialkoxysilane having the propyl spacer as found in formula 1 of instant claim 1 (Scheme 1). Lambert et al. further teaches that the cyclodextrin compounds are subjected to sol-gel reactions (p. 136, left column and scheme 3). Yim et al. and Lambert et al. are combinable because they are from the same field of endeavor, namely, compositions based on cyclodextrins and polysilsesquioxane. At the time of invention, a person having ordinary skill in the art would have found it obvious to employ the cyclodextrin alkoxy silanes having a propyl spacer as taught by Lambert et al. as the reactive porogen materials as taught by Yim et al. and would have been motivated to do so because the propyl spacer provides for increased flexibility, resulting in better incorporation into the host polysilsesquioxane matrix materials of Yim et al. Further the chemical synthesis to prepare such propylalkoxy silane cyclodextrins is straightforward and high yielding (p. 132, right column, paragraphs 2 and 4-5). The result of employing the cyclodextrin porogens of Yim et al. having

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the propyl spacer as taught by Lambert et al. and subjecting the cyclodextrin porogens of Yim et al. to a sol-gel reaction, a reactive nanoparticulate porogen would implicitly be formed.

Claim 5: Yim et al. further teaches that the dielectric matrix comprises a polymethylsilsesquioxane copolymer (example 2-2).

Claims 6-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yim et al. (US 2003/0055134), in view of Lambert et al. (*Chem. Mater.* **2003**, *15*, 131-145).

Claims 6 and 8: Yim et al. teaches a nanoporous composition comprising a porogen derivative (abstract) and an inorganic silicate precursor (paragraphs 0018 and 0065). Yim et al. further teaches that the porogen derivative is a cyclodextrin having the general formula as shown in paragraph 0043. Yim et al. further teaches that specific cyclodextrin porogens having the general structures as shown in paragraph 0046. Yim et al. teaches that R_1 , R_2 , and R_3 can be a $Si_{r_1}R_{2r_2}R_{3r_3}$ group with r_1 - r_3 being a C_{1-5} alkoxy group (paragraph 0045). The only structural differences between Yim et al. and formula 1 of instant claim 1 is the presence of a propyl spacer between the oxygen and the $Si_{r_1}R_{2r_2}R_{3r_3}$ group. However, Lambert et al. teaches cyclodextrin compounds which comprises a trialkoxysilane having the propyl spacer as found in formula 1 of instant claim 1 (Scheme 1). Lambert et al. further teaches that the cyclodextrin compounds are subjected to sol-gel reactions (p. 136, left column and scheme 3). Yim et al. and Lambert et al. are combinable because they are from the same field of endeavor, namely, compositions based on cyclodextrins and polysilsesquioxane. At the time of invention, a person having ordinary skill in the art would have found it obvious to employ the cyclodextrin alkoxy silanes (and employ sol-

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gel reactions to incorporate the cyclodextrin compounds into a matrix material) having a propyl spacer as taught by Lambert et al. as the reactive porogen materials as taught by Yim et al. and would have been motivated to do so because the propyl spacer provides for increased flexibility, resulting in better incorporation into the host polysilsesquioxane matrix materials of Yim et al. Further the chemical synthesis to prepare such propylalkoxysilane cyclodextrins is straightforward and high yielding (p. 132, right column, paragraphs 2 and 4-5). The result of employing the cyclodextrin porogens of Yim et al. having the propyl spacer as taught by Lambert et al. and subjecting the cyclodextrin porogens of Yim et al. to a sol-gel reaction, a reactive nanoparticular porogen would implicitly be formed.

Claim 7: Yim et al. further teaches that the concentration of the cyclodextrin may be from 10-70 wt% and the cyclodextrin plus matrix precursor may be present at concentrations of from 20-99.9 wt% (paragraph 0056). These amounts partially encompass the claimed weight ratios is instant claim 7.

Claim 9: Yim et al. further teaches that the dielectric matrix comprises a polymethylsilsesquioxane copolymer (example 2-2).

Claims 10-13: Yim et al. further teaches dielectric films having dielectric constants of below 2.1 (Table 3). Yim et al. does not explicitly teach that the porosity is between 21 and 51% when the relative volume of the template solution with reference to the matrix solution is between 40 and 49%. However, Yim et al., in view of Lambert et al., collectively teach the same porogens, same inorganic silicate precursors and same concentrations of the matrix solution and porogen of instant claims 6-9, it implicitly follows that the porosity of the resultant heat-treated compositions fall within the range of instant claims 10-13.

Relevant Art Cited

The prior art made of record and not relied upon but is considered pertinent to applicants disclosure can be found on the attached PTO-892 form.

Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert Loewe whose telephone number is (571) 270-3298. The examiner can normally be reached on Monday through Friday from 5:30 AM to 3:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on (571) 272-1302. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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/R. L./
Examiner, Art Unit 1796
31-Jan-08

/Randy Gulakowski/
Supervisory Patent Examiner, Art Unit 1712